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## AMENDMENTS TO THE CLAIMS

Please amend claims 1, 4-7, 10-13, and 16-26, and cancel claims 14 and 15, as set forth below. Withdraw claims 27-30 without prejudice or disclaimer.

The current listing of claims replaces all prior listings.

- 1. (Currently Amended) A method comprising:
  - a) immobilizing one or more unlabeled nucleic acid molecules to a surface;
- b) <u>sequentially releasing the using an exonuclease to release</u> unlabeled nucleotides from one end of one or more of the <u>immobilized</u> unlabeled nucleic acid molecules <u>with an</u> exonuclease;
- c) separating the <u>released</u> nucleotides from the exonuclease and the one or more nucleic acid molecules;
- d) identifying the <u>released</u> unlabeled nucleotides <u>in a buffer comprising an alkali-metal</u> <u>halide salt</u> by Raman spectroscopy; and
  - e) determining the sequence of the nucleic acid from the identified nucleotides.
- 2. (Original) The method of claim 1, wherein single molecules of unlabeled nucleotides are identified by Raman spectroscopy.
- 3. (Original) The method of claim 2, wherein a single nucleic acid molecule is sequenced.
- 4. (Currently Amended) The method of claim 1, wherein multiple nucleic acid molecules of the same sequence or multiple nucleic acid molecules of different sequences are sequenced simultaneously.
- 5. (Currently Amended) The method of claim 1, wherein the one or more nucleic acid molecules are [is] immobilized attached to [a] the surface via covalent attachment.
- 6. (Currently Amended) The method of claim 1, wherein the released nucleotides are identified

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by surface enhanced Raman spectroscopy (SERS), surface enhanced resonance Raman spectroscopy (SERRS) and/or coherent anti-Stokes Raman spectroscopy (CARS).

- 7. (Currently Amended) A method comprising:
- a) obtaining nucleotides covalently linked to gold or silver, or gold or silver nanoparticle(s), wherein the nucleotide and nanoparticles are linked via a terminal reactive cross-linking group, selected from the group consisting of epoxide groups, azido groups, triazine groups, arylazido groups and diazo groups;
- b) <u>synthesizing one or more nucleic acid molecules comprising the gold or silver, or gold</u> or silver nanoparticles;
  - c) immobilizing the nucleic acid molecule of step (b) on a solid substrate;
- d) sequentially <u>releasing</u> removing nucleotides from one end of one or more nucleic acid molecules <u>via an exonuclease</u>;

attaching each nucleotide to at least one nanoparticle;

- e) identifying the <u>released unlabeled</u> nucleotides <u>in a buffer comprising an alkali-metal</u> <u>halide salt</u> by Raman spectroscopy; and
  - <u>f</u>) determining the sequence of the nucleic acid <u>molecule</u>.
- 8. (Original) The method of claim 7, wherein single molecules of nucleotides are identified by Raman spectroscopy.
- 9. (Original) The method of claim 8, wherein a single nucleic acid molecule is sequenced.
- 10. (Currently Amended) The method of claim 7, wherein <u>multiple nucleic acid molecules of the same sequence or multiple nucleic acid molecules of different sequences are sequenced simultaneously the nucleotides are unlabeled.</u>
- 11. (Currently Amended) The method of claim 7, wherein the alkali-metal halide salt is selected from the group consisting of MgCl, CaCl, NaF, KBr, LiI, and LiCl the nanoparticles are

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modified with one or more linker compounds.

- 12. (Currently Amended) The method of claim 11, wherein the alkali-metal halide salt is LiCl the nucleotides are covalently attached to the linker compounds.
- 13. The method of claim [12] <u>7</u>, wherein the linker compound is 3-glycidoxypropyltrimethoxysilane (GOP).
- 14. (Canceled)
- 15. (Canceled)
- 16. (Currently Amended) The method of claim 1[5], wherein nanoparticles are attached to the 3' end of the nucleic acid.
- 17. (Currently Amended) The method of claim 7, wherein [said] the released nucleotides are identified by surface enhanced Raman spectroscopy (SERS), surface enhanced resonance Raman spectroscopy (SERS) and/or coherent anti-Stokes Raman spectroscopy (CARS).
- 18. (Currently Amended) The method of claim 7, further comprising separating the nucleotides from the one or more nucleic acid molecules by transferring the released nucleotides through a microfluidic channel.
- 19. (Currently Amended) The method of claim [7] 18, wherein microfluidic channel is a metal coated channel an exonuclease is used to remove the nucleotides from said nucleic acid.
- 20. (Currently Amended) The method of claim 19[6], wherein the <u>metal is silver, gold, platinum,</u> copper, or aluminum nucleotides are removed by acid hydrolysis.

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- 21. (Currently Amended) The method of claim 20, wherein the nanoparticle and microfluidic channel comprise silver further comprising using acid hydrolysis to remove the purine or pyrimidine base from the nucleotide.
- 22. (Currently Amended) A method comprising:
  - a) obtaining pyrimidine nucleotides that are attached to Raman labels;
  - b) synthesizing a nucleic acid molecule comprising the labeled nucleotides;
  - c) removing nucleotides from one end of the nucleic acid;
- d) identifying the <u>released</u> nucleotides <u>in a buffer comprising an alkali-metal halide salt</u> by Raman spectroscopy; and
  - e) determining the sequence of the nucleic acid molecule.
- 23. (Currently Amended) The method of claim 22, wherein the alkali-metal halide salt is selected from the group consisting of MgCl, CaCl, NaF, KBr, LiI, and LiCl single nucleotide molecules are identified by Raman spectroscopy.
- 24. (Currently Amended) The method of claim 22, wherein the alkali-metal halide salt is LiCl each type of nucleotide is labeled with a distinguishable Raman label.
- 25. (Currently Amended) The method of claim 22, wherein <u>multiple nucleic acid molecules of the same sequence or multiple nucleic acid molecules of different sequences are sequenced simultaneously only pyrimidine nucleotides are labeled with Raman labels.</u>
- 26. (Currently Amended) The method of claim 22, further comprising:
  - (i) obtaining at least one template nucleic acid molecule;
  - (ii) hybridizing the template nucleic acid molecule to a primer; and
  - (iii) adding a DNA polymerase to synthesize [said] the nucleic acid molecule.
- 27. (Withdrawn) An apparatus comprising:

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- a) a reaction chamber;
- b) a microfluidic channel in fluid communication with the reaction chamber;
- c) a flow-through cell in fluid communication with the microfluidic channel; and
- d) a Raman detection unit operably coupled to the flow-through cell.
- 28. (Withdrawn) The apparatus of claim 27, wherein the Raman detector is capable of detecting single molecules of nucleotides.
- 29. (Withdrawn) The apparatus of claim 28, wherein the nucleotides are unlabeled.
- 30. (Withdrawn) The apparatus of claim 27, further comprising nanoparticles in the flow-through cell.